

REMARKS

The Office Action mailed January 5, 2004 has been received and the Examiner's comments carefully reviewed. Claims 1, 5-7, 12, 13, and 41 have been amended. Claims 70-74 have been added, and read upon the elected species. No new subject matter has been added. Claim 4 has been cancelled. Claims 1-3, and 5-74 are currently pending. Applicants respectfully submit that the pending claims are in condition for allowance.

Drawing Amendments

Figures 5-7, 18, 19, and 21 have been amended to correct errors in the formal drawings previously submitted on November 28, 2001. Annotated drawings are enclosed herewith to show the changes made. In particular, Figure 5 has been amended to properly depict the frustoconical inner surfaces of the device. The amendments to Figure 5 are supported in the specification on page 5, lines 22-26. Figure 6 has also been amended to properly depict the frustoconical inner surfaces of the device, the amendments being supported in the specification on pages 5-6, lines 26-8. Figure 7 has also been amended to properly depict the cylindrical inner surface 18 of the device, the amendments being supported in the specification on page 6, lines 8-10.

Figure 18 has been amended to properly depict the legs 63 of the locking element 51, as supported by the originally filed Figure 18. Figure 18 has further been amended to add a surface that should be shown in the perspective view. Figure 19 has been amended to clarify that the locking aperture 52 is formed on a surface that is partially shown (i.e. the outer circle should indicate that the surface extends beyond what is shown). Figure 21 has been amended to remove cross-hatching shown in the grooves 61 illustrated in the locking aperture 52.

Applicants submit that no new matter has been entered by the amendments made to the drawings, and respectfully request approval of the amendments. A new set of formal drawings, including the above amendments, is submitted herewith.

Specification Objections

The Examiner objected to the specification for failing to provide proper antecedent basis for the subject matter of "a ring" recited in claim 5. Applicants have

amended claim 5 to clarify that the ring is "a ring of contact." The specification supports this limitation, for example, on page 9, at lines 11-14. Applicants respectfully request withdrawal of this specification objection.

Claim Objections

The Examiner objected to claims 1, 6, 7, 12, and 41 for various informalities. Each of claims 1, 6, 7, 12, and 41 has been amended to correct the informalities. Applicants respectfully request withdrawal of these claim objections.

Rejections Under 35 U.S.C. §102

I. The Examiner rejected claims 1, 3-7, 11-14, 16-21, 37, 41 and 42 under 35 U.S.C. §102(e) as being anticipated by Lyons et al. (U.S. Patent 6,413,259) with reference to Exhibit A. Applicants respectfully traverse this rejection.

Lyons discloses a bone plate 12 having apertures 16 that receive screws 14. As shown in FIG. 2, each of the apertures 16 has a cross-sectional construction that corresponds to the cross-sectional construction of the screw head. Still referring to FIG. 2, the corresponding construction of the aperture 16 and the head of the screw 14 provides a surface contact between the screws 14 and the bone plate 12.

A. Claims 1, 3, 5-7, 11-14, and 16-21

Claim 1 recites a bone fixation device including one or more plates and one or more fasteners. The plate includes fastener-receiving apertures having a frustoconical inner surface. The fasteners have a head that has an arcuate outer surface. As defined in the specification, "the term "arcuate outer surface" refers to a curved surface having a radial arc."

Lyons does not disclose a fastener having an arcuate outer surface. If the Examiner is to characterize the aperture 16 of the bone plate 12 of Lyons as a frustoconical inner surface, then the head of the screw 14 is correspondingly a frustoconical outer surface (see FIG. 2). The outer surface of the screw's head is not arcuate.

At least because Lyons does not disclose an aperture having a frustoconical outer surface in combination with a fastener head having an arcuate outer surface, Applicants

respectfully submit that independent claim 1, and dependent claims 3, 5-7, 11-14, and 16-21 are patentable.

B. Claim 37

Claim 37 recites a bone fixation device including one or more plates and one or more screws. Fastener-receiving apertures extend through the plate, and include a major opening having a frustoconical inner surface. The screws have a head that has an arcuate outer surface.

For similar reasons as discussed with regards to claim 1, Applicants respectfully submit that independent claim 37 is patentable.

C. Claims 41 and 42

Claim 41 recites a kit including one or more plates and one or more fasteners. The plates include fastener-receiving apertures having a frustoconical inner surface. The fasteners have a head that has an arcuate outer surface.

For similar reasons as discussed with regards to claim 1, Applicants respectfully submit that independent claim 41 and dependent claim 42 are patentable.

II. The Examiner rejected claims 1 and 2 under 35 U.S.C. §102(b) as being anticipated by Errico et al. (U.S. Patent 5,876,402) with reference to Exhibit B. Applicants respectfully traverse this rejection, but have amended claim 1 to advance this application to allowance. Applicants reserve the right to pursue the original subject matter via a continuing application.

Errico discloses an assembly including a plate 100, a coupling element 132 positioned within a hole 110 formed in the plate 100, and a screw 120. The screw 120 has a semi-spherically shaped head portion 122. In use, the semi-spherically shaped head portion 122 is inserted into an interior semi-spherical volume 140 formed in the coupling element 132. The screw 120 and the coupling element 132 are then inserted through the hole 110 of the plate 100. Column 7, lines 7-10 and 41-42.

Claim 1 has been amended to clarify that the arcuate outer surface of the fastener head contacts the frustoconical inner surface of the fastener-receiving aperture of the

plate. The screw 120 of Errico does not have an arcuate surface that contacts the tapered surface 111 of the hole 110 in the plate 100. Rather, the coupling element 132 contacts the tapered surface 111 of the hole 110. The head 122 of the screw 120 contacts a semi-spherical surface (volume 140) of the coupling element 132. The head of the screw 120 does not contact the hole 110 formed in the plate, as required by claim 1.

At least for this reason, Applicants respectfully submit that independent claim 1, and dependent claim 2 are patentable.

III. The Examiner rejected claims 1, 7, 8, 37, 38 and 40 under 35 U.S.C. §102(e) as being anticipated by Vito (U.S. Patent 5,931,838) with reference to Exhibit C. Applicants respectfully traverse this rejection, but have amended claim 1 to advance this application to allowance.

Vito discloses a fixation assembly including a plate 20 and a screw 10. The plate 20 defines a hole having a tapered construction.

A. Claims 1, 7, and 8

Claim 1 recites a bone fixation device including one or more plates and one or more fasteners. The plate includes fastener-receiving apertures having a frustoconical inner surface. The fasteners have a head that has an arcuate outer surface. The arcuate outer surface of the head contacts the frustoconical inner surface of the fastener-receiving aperture of the plate.

The screw 10 of Vito does not have an arcuate surface that contacts the tapered surface (29) of the hole in the plate 20. Rather, the rounded surface of the round-head screw 10 sits above an upper surface of the plate 20. Further, FIG. 1D of Vito illustrates that no portion of the screw 10 contacts the tapered construction of the hole formed in the plate 20.

At least for this reason, Applicants respectfully submit that independent claim 1, and depend claims 7 and 8 are patentable.

B. Claims 37, 38 and 40

Each of independent claims 37 and 40 recites a bone fixation device including one or more plates having one or more fastener-receiving apertures. The fastener-receiving apertures includes a major opening proximate an upper surface and a minor opening proximate a bone-contacting surface. The device further includes one or more screws having a head with an arcuate outer surface, the arcuate outer surface of the head being positioned adjacent to a frustoconical inner surface of the fastener-receiving aperture.

The screw 10 of Vito does not have a major opening proximate an upper surface and a minor opening proximate a bone-contacting surface. In contrast, a major opening or "wide lower region 28" (column 3, lines 40-45) is located proximate to the bone-contacting surface, not the upper surface (see also FIG. 1C). Also, a minor opening 27, 29 is located proximate to the upper surface, not the bone-contacting surface.

Further, the screw 10 of Vito does not have an arcuate surface that is positioned adjacent to a frustoconical inner surface of the fastener-receiving aperture. Rather, the rounded surface of the round-head screw 10 is positioned above a planar upper surface of the plate 20.

At least for these reasons, Applicants respectfully submit that independent claims 37 and 40, and depend claim 38 are patentable.

Rejections Under 35 U.S.C. §103

The Examiner rejected claim 22 under 35 U.S.C. §103(a) as being unpatentable over Lyons et al. (U.S. Patent 6,413,259) in view of Michelson (U.S. Patent 6,193,721). Applicants respectfully traverse this rejection.

Claim 22 depends upon claim 1. In view of the remarks regarding independent claim 1, further discussion regarding the independent patentability of dependent claim 22 is believed to be unnecessary. Applicants submit that dependent claim 22 is in condition for allowance.

New Claims 70-74

New claim 70 recites a device having a bone plate defining an aperture, and a fastener having a fastener head. The aperture includes a first contact surface having a

first cross-sectional configuration. The fastener head includes a second contact surface having a second, non-corresponding, cross-sectional configuration to that of the first cross-sectional configuration of the aperture. The first and second contact surfaces contact one another when the fastener head is received within the aperture of the bone plate.

Because none of the cited art teaches or suggests a device as characterized in claim 70, Applicants respectfully submit that independent claim 70, and dependent claims 71-73 are patentable.

New claim 74 recites a device having a bone plate and a plurality of fasteners. The bone plate defines a plurality of fastener-receiving apertures having first contact surfaces. The fasteners include heads having second contact surfaces. The first and second contact surfaces have non-corresponding geometries such that a ring of contact is formed between the first contact surface of the plate and the second contact surface of the fasteners.

None of the cited art discloses a device having first and second contact surfaces, as characterized, that form a ring of contact. At least for this reasons, Applicants respectfully submit that independent claim 74 is patentable.

SUMMARY

It is respectfully submitted that each of the presently pending claims (claims 1-3, and 5-74) is in condition for allowance and notification to that effect is requested. The Examiner is invited to contact Applicants' representative at the below-listed telephone number if it is believed that prosecution of this application may be assisted thereby.

Although certain arguments regarding patentability are set forth herein, there may be other arguments and reasons why the claimed invention is patentably distinct. Applicants reserve the right to raise these arguments in the future.

Respectfully submitted,



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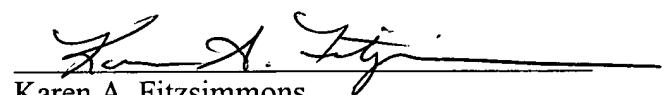

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FIG. 5

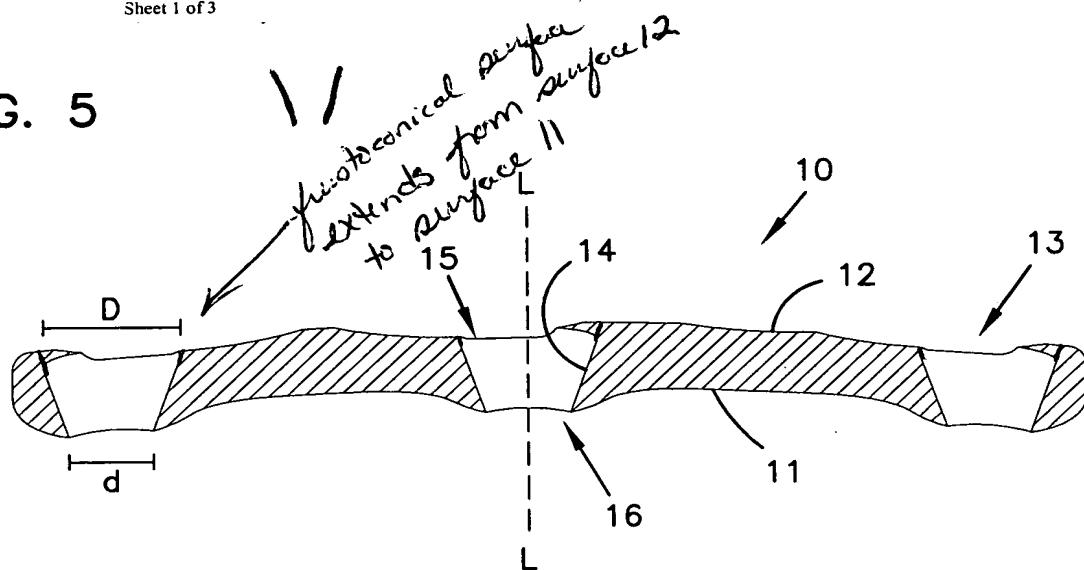


FIG. 6

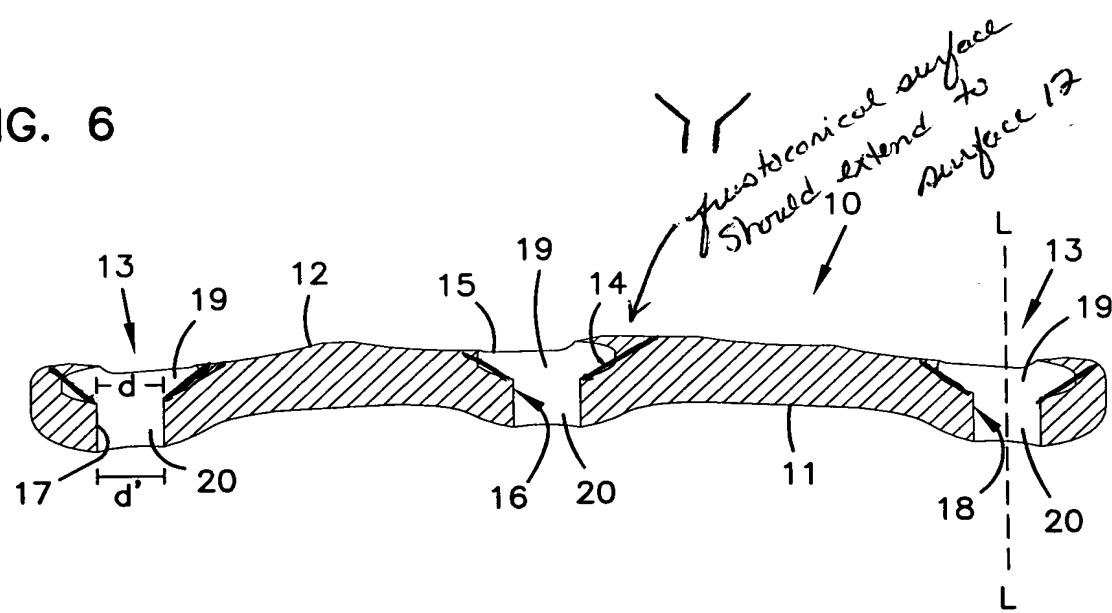


FIG. 7

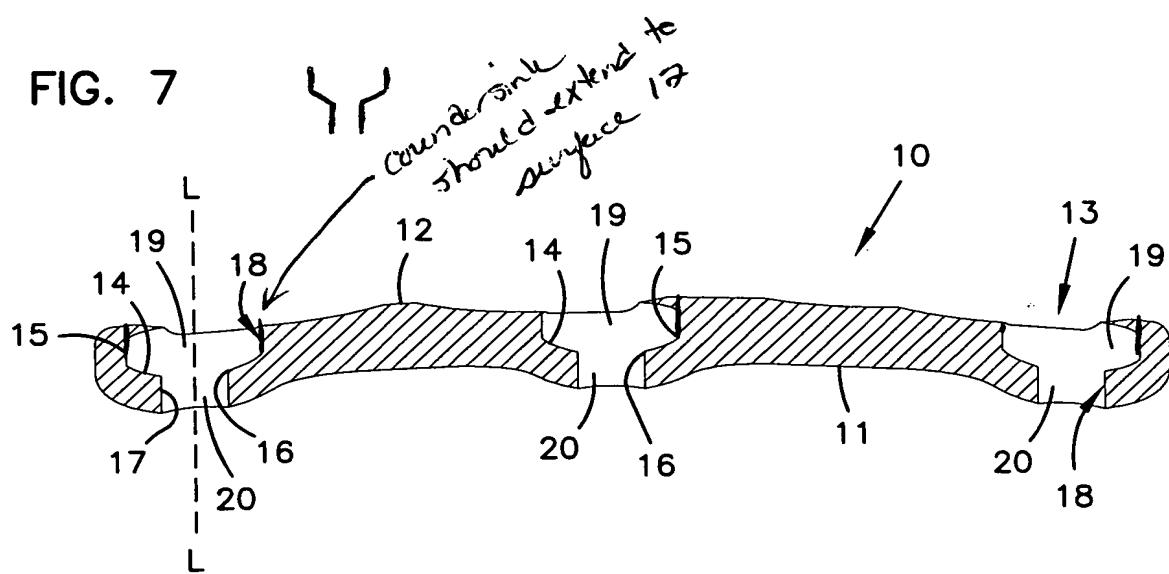


FIG. 18

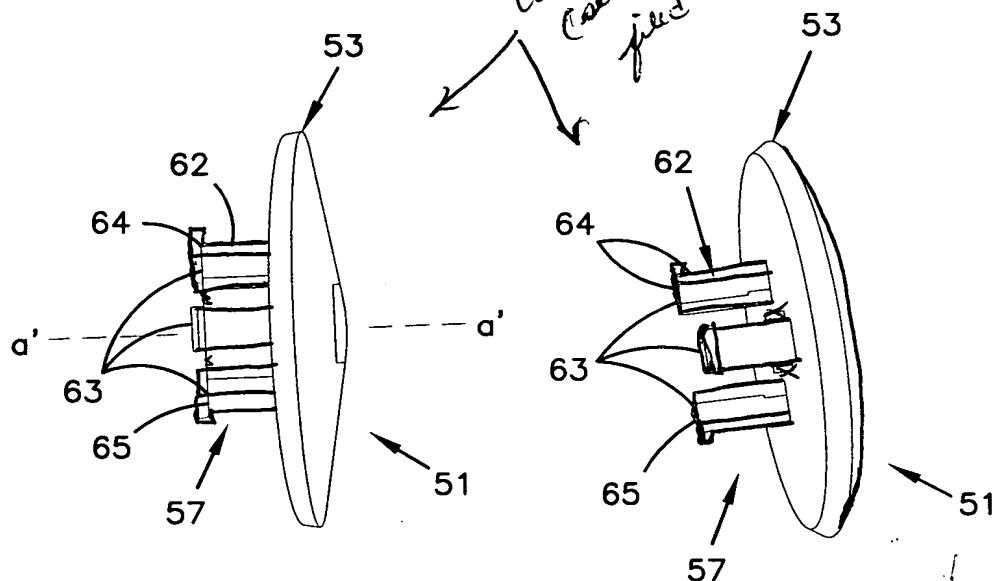


FIG. 19

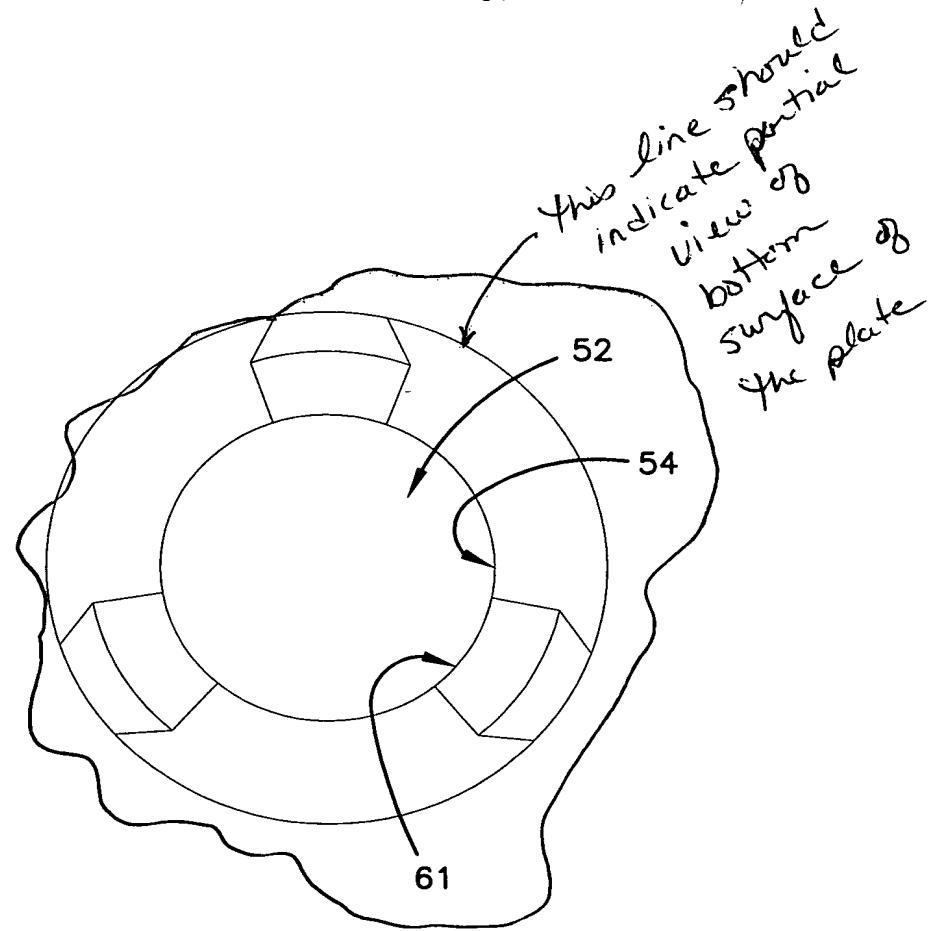


FIG. 20

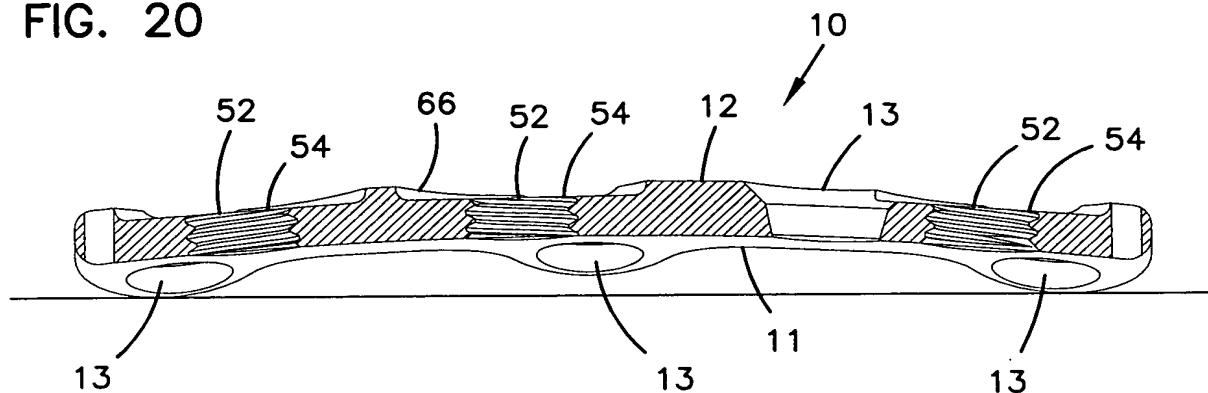


FIG. 21

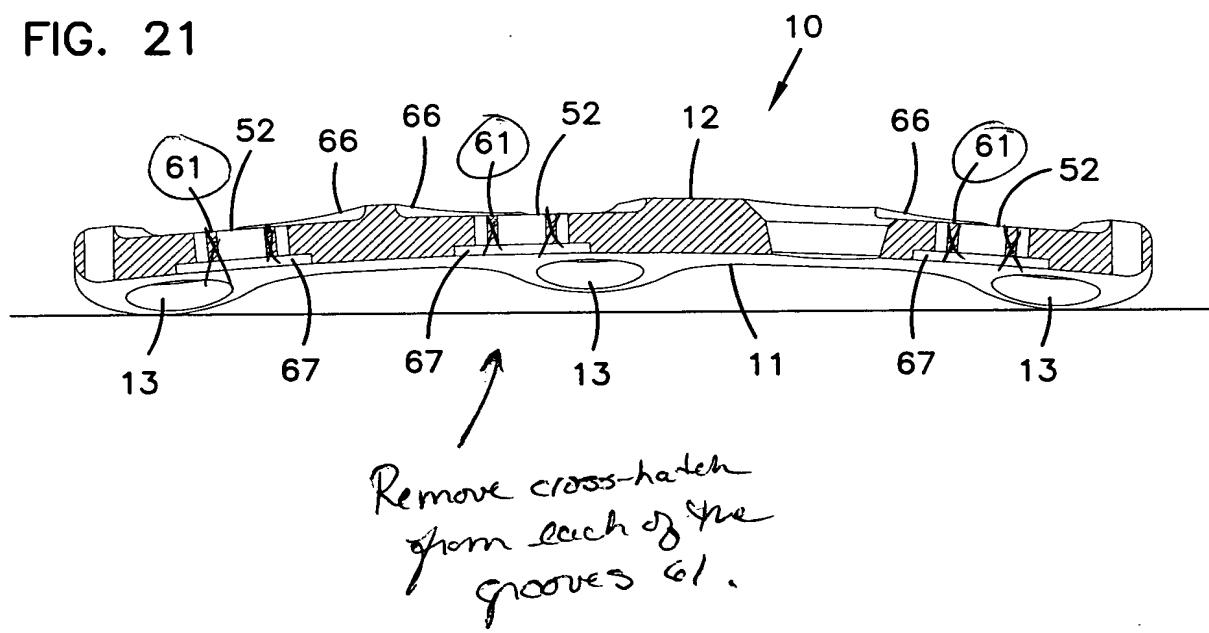


FIG. 22

